numbers of events with two muons of opposite sign in the final state, or with a muon and an electron. All properties of these events seem to be consistent with charm's being produced in about 5% of neutrino interactions. So far no wholly satisfactory result has been reported on the production of charmed baryons. The Columbia–Fermilab experiment by Wonyong Lee's group has a clear signal with antilambda and three pions. They should also see something with lambda and three pions but they do not, so the significance of the antilambda signal must be questioned. It seems likely that the bubble chamber neutrino experiments will be the first to establish the existence of charmed baryons, but the results from several groups on strange particles from charmed particle decay are fluctuating wildly due to small statistics and no clear conclusions can yet be drawn.

More signs of τ

For two years now there have been signs from SPEAR and from DORIS that the increase of e^+e^- cross sections at about 4 GeV/c^2 is due to two thresholds, not just to the charm threshold. M. Perl, using SPEAR, was the first to identify a class of events which have a muon and an electron with opposite signs and in which a great deal of the energy escapes as unseen neutral particles. New detectors at SPEAR and new data from DORIS have confirmed the existence of these events and it looks increasingly convincing that they are caused by a new heavy lepton, the tau (τ), a big brother to the electron and the muon. In particular, the cross section for producing them seems to rise smoothly and steadily from threshold towards the correct asymptotic value for the pair production of spin-$\frac{1}{2}$ particles, with mass about 1,850 to 1,900 MeV/c^2, coupled to the photon in the normal way. There was some excitement early in the conference when it seemed that one of the most easily predicted decays of the τ (to a pion and a neutrino) was not seen, but the experimenters looked more carefully at their data and were eventually convinced that there was no anomaly.

Neutrino physics

In neutrino physics the new results from the CERN SPS have come at the same time as the second generation results from Fermilab, with the consequence that some of the odder effects suggested by single experiments in the past can now be seen to have gone away. In particular the Harvard – Pennsylvania – Wisconsin – Fermilab, 'HPWF', suggestion of a threshold effect at neutrino energy of about 40 GeV has not been confirmed by any other group. But there are new effects on a more subtle level which are beginning to be believed because they are seen in so many experiments using very different techniques. Until now it has been usual to interpret neutrino data in terms of the simplest quark–parton picture. This will clearly not work any longer. For some years it had been clear that electron–proton and muon–proton scattering data required important corrections to the simple quark model. Now the same corrections have been shown to apply to the charged current neutrino data. Theorists are very pleased about this, because the kind of correction required is just what would be expected from the more formal theory of quarks—quantum chromodynamics 'QCD'. Neutral current neutrino data has also been improving rapidly, and it is clear that neutral current interactions producing strongly interacting particles (hadrons) are very well described by the Salam–Weinberg GIM model (see *News and Views* **264**, 398; 1976) otherwise known as SU(2) × U(1). P. Sandars (University of Oxford) gave a status report on the other end of the neutral current field—the search for the atomic effects of interference between the weak neutral current and the electromagnetic interaction. Here there are problems. Sandar's group and a group at Washington State University have performed optical rotation experiments with laser light passing through bismuth vapour. If the Weinberg–Salam model is true, and

Has the *src* gene product been found?

from Robin Weiss

AVIAN sarcoma viruses carry a gene, *src*, which is required for the transformation of fibrobasts and the induction of sarcomas, but which is superfluous for virus replication. Because mutants of *src* have been isolated that are temperature sensitive for the maintenance of the transformed state of the cell, it is widely assumed that *src* codes for a transforming protein. On page 346 in this issue of *Nature*, Brugge and Erikson report the detection of a transformation-specific antigen which appears to be a good candidate for the *src* protein. Sera obtained from rabbits bearing tumours induced by avian sarcoma virus (ASV) react with a protein of 60,000 daltons present in transformed cells, which is unrelated to viron structural proteins. The same protein is found in ASV-transformed avian and mammalian cells, strongly indicating that it is a virus-coded protein. Cells infected with transformation-defective, *src* deletion mutants of ASV do not express this protein; neither could it be immunoprecipitated from cells infected with temperature-sensitive *src* mutants and incubated at the non-permissive temperature.

This is not the first time a transformation-specific antigen has been identified in ASV-transformed cells. There is an extensive literature (reviewed by Kurth *Biomembranes* **8**, 167; 1976) on a tumour-specific cell surface antigen (TSSA) to which Brugge and Erikson make no reference. It will be important to see whether the 60,000 dalton protein is related to TSSA.

Several attempts have been made to identify the *src* gene product by *in vitro* translation of ASV RNA. Pawson, Martin and Smith (*J. Virol.* **19**, 950; 1976) were not able to identify any polypeptide present in translation products of the ASV genome that was absent from those of a transformation-defective (*td*) mutant. Two recent reports, however, each claim that two polypeptides of approximately 18,000 and 25,000 daltons can be detected after translation of ASV RNA but not of *td* ASV RNA in the reticulocyte system (Kamine & Buchanan *Proc. natn. Acad. Sci. U.S.A.* **74**, 2011; 1977; Beemon & Hunter *Proc. natn. Acad. Sci. U.S.A.* **74**, 3302; 1977). The work of Beemon and Hunter is particularly interesting because they have demonstrated by analysis of tryptic peptides that the two polypeptides absent in *td* ASV translation products are unrelated to the precursor polypeptide of the virion core proteins. Since *src* is located near the 3′ end of the ASV genome it is not easily translated from undegraded genomic RNA preparations, but selection of smaller fragments containing the poly(A) at the 3′ end of the molecule proved effective for the translation of these presumed *src* products.

The antiserum that reacts with the 60,000 dalton polypeptide should be useful for selective precipitation of *in vitro* translation products. In their report, Brugge and Erikson already quote a further paper in press on that subject.

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